



# **Applications Research**

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**Presidential Advisory Committee on  
High Performance Computing and Communications,  
Information Technology,  
and the Next Generation Internet**

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**Presented by  
David B. Nelson**



# Types of Applications

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- Compute-intensive applications
  - Simulation and modeling
  - Distributed computing
- Data-intensive applications
  - Data mining or analysis
  - Visualization
  - Digital library searches
- Network-intensive applications
  - Browsing
  - Collaboration
  - Remote control
  - Visualizing/virtual reality



# Security

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- Collaborations in Internet Security (CIS) testbed
  - Kerberos, authentication, encryption, certificates
  - [www.fnc.gov/cis\\_page.html](http://www.fnc.gov/cis_page.html)
- End-to-end OC-12 hardware encryption (NSA/Sandia)
- Modular encryption technologies (NSA)
- Pilot on computer-based patient records (AHCPR)
- Role-based authentication (DOE2000)
- Remote facility operation (DOE, NSF, NASA)



# Interoperability

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- Distributed computing
  - Globus (DOE)
  - Computational grid (NSF-PACI)
- Web based applications
- Portable code techniques for computing
  - MPI, PVM, Cumulus, SciTL (DOE)
- Interoperable networks (DOE, NSF, NASA)
  - ATM and/or IP based
  - QoS provisions for applications



# Human Factors

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- Human-system interfaces (DARPA, NSF)
  - Speech recognition, interfaces for special needs
- Human-computer interfaces (NASA)
  - Interactive visualization, VR, aviation interfaces
- Learning technologies (NSF)
- Environmental modeling for decision makers (EPA)
- Digital libraries (DARPA, NSF, NASA)
- Knowledge networking (NSF)
- Human-factor-based QoS (DOE)
- Multicast



# Testbeds and Collaboratories

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- **NGI testbeds**
  - Scaling and services for applications
  - Candidates include distributed computing, collaboration and remote operation, distance education, crisis management, etc.
- **DOE 2000**
  - Collaboratory technologies and pilots
  - Scientific template library for computing applications
- **DARPA intelligent collaboration and visualization**
  - Annotated multi-media
- **NSF PACI**
  - Computational grid, metacomputing, distributed workstations